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# PART Env-Ws 380 FILTRATION, DISINFECTION, TREATMENT PLANT AND WASTE RECYCLING

## Env-Ws 380.01 Abbreviations.

(a) "C" means residual disinfectant concentration in mg/l.

(b) "CT" or "Ctcalc" means the product of residual disinfectant concentration in mg/l determined before or at the first customer, and the corresponding disinfectant contact time in minutes, that is, C x T.

(c) "CPE" means comprehensive performance evaluation.

(d) "CTA" means comprehensive technical assistance.

(e) "CT99.9" means the CT value required for 99.9 per cent inactivation of giardia lamblia cysts as determined from Env-Ws 380.

(f) "HPC" means heterotrophic plate count.

(g) "Mg/L" means concentration in milligrams per liter.

(h) "NTU" means nephelometric turbidity units.

(i) “SW/GWUDISW” means surface water or groundwater under the direct influence of surface water.

(j) "T" means disinfectant contact time in minutes.

(k) "∑" means "the sum of" in mathematical calculations.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05

## Env-Ws 380.02 Definitions.

(a) "Backwash" means the process of reversing the flow of water back through the filter media to remove entrapped solids.

(b) "Coagulation" means a process using coagulant chemicals and mixing by which colloidal and suspended materials are agglomerated into flocs.

(c) "Comprehensive performance evaluation" means a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices to identify factors that might be adversely impacting a plant's capability to achieve compliance and which emphasizes approaches that can be implemented without significant capital improvements.

(d) "Conventional filtration " means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in particulate removal.

(e) "Cryptosporidium" means a microorganism found in raw water which may cause illness after ingestion.

(f) "Diatomaceous earth filtration" means a process resulting in particulate removal in which a precoat cake of diatomaceous earth filter media is deposited on a support membrane, and while the water is filtered by passing through the cake on the support membrane, additional filter media is continuously added to the feed water to maintain the permeability of the filter cake.

(g) "Direct filtration" means a series of processes including coagulation and filtration but excluding sedimentation resulting in particulate removal.

(h) "Disinfectant" means any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone, added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

(i) "Disinfectant contact time" or T in CT calculations means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration is measured.

(j) "Disinfection" means a process which inactivates pathogenic organisms in water using chemical oxidants or equivalent agents.

(k) "Disinfection profile" means a summary of daily giardia lamblia inactivation through the treatment plant.

(l) "Disinfection sequence" means that segment of a water supply main between point of disinfectant application and the first customer or subsequent point of disinfectant application.

(m) "Filter profile" means a graphic representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run, from startup to backwash inclusively, that includes an assessment of filter performance while another filter is being backwashed.

(n) "Filtration" means a process for removing particulate matter from water by passage through porous media.

(o) "Flocculation" means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

(p) "Giardia lamblia" means a microorganism found in raw water which can cause illness after ingestion.

(q) “Ground-water under the direct influence of surface water” means **“**ground-water under the direct influence of surface water**”** as defined in 40 CFR 141.2, namely “any water beneath the surface of the ground with significant occurrence of insects or other microorganisms, algae, or large-diameter pathogens such as giardia lamblia or cryptosporidium or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions.”

(r) "High turbidity event" means a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

(s) "Inactivation" is the process by which a microorganism is altered so that the microorganism is unable to replicate.

(t) "Inactivation ratio" means the ratio of Ctcalc to CT99.9, Ctcalc/CT99.9.

(u) "Legionella" means a genus of bacteria, some species of which have caused a type of pneumonia called legionnaires disease.

(v) "Owner" means the person in possession of or having legal ownership of a public water system.

(w) "Point of disinfectant application" is the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.

(x) "Residual disinfectant concentration", or C in CT calculations, means the concentration of disinfectant measured in mg/l in a representative sample of water.

(y) "Sedimentation" means a process for removal of solids before filtration by gravity or separation.

(z) "Slow sand filtration" means a process involving passage of raw water through a bed of sand at low velocity resulting in particulate removal by physical and biological mechanisms.

(aa) "Surface water" means all water which is open to the atmosphere and subject to surface runoff.

(ab) "Surface water/ground–water under the direct influence of surface water" system means a public water system using surface water or ground–water under the direct influence of surface water as a source that is subject to the requirements of Env-Ws 380.

(ac) "Total inactivation ratio" means the sum of the inactivation ratios, represented by $\sum$ (Ctcalc/CT99.9), calculated by adding together the inactivation ratio for each disinfection sequence in the case of a public water system which applies disinfectants at more than one point prior to the first customer.

(ad) "Uncovered finished water storage facility" means a tank, reservoir, or other facility used to store water that will undergo no further treatment except residual disinfection and is open to the atmosphere.

(ae) "Unusual and unpredictable" means markedly contrasting with historical records, not indicative of generally predominating conditions, and not directly controllable by the water system operator.

(af) "Virus" means a group of infectious agents ranging from 10-250 nanometers in diameter, composed of a protein sheath surrounding a nucleic acid core and capable of infecting all animals, plants, and bacteria and characterized by total dependence on living cells for reproduction and by a lack of independent metabolism.

(ag) "Waste recycling" means the return of spent filter backwash water, thickener supernatant, and liquids from treatment solids dewatering processes to the core process for treatment.

(ah) "Waterborne disease outbreak" means the occurrence of acute infectious illness epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; amd by #7754, eff 8-21-02; ss by #8352, eff 5-14-05

Env-Ws 380.03 Purpose and Scope.

(a) The requirements in this part constitute national primary drinking water rules as specified in 40 CFR 141.1 which establish requirements for filtration and disinfection in addition to criteria under which filtration and disinfection are required elsewhere in this part.

(b) This part establishes criteria under which filtration shall be required as a treatment technique for public water systems supplied by a surface water source and public water systems supplied by a source of ground-water under the direct influence of surface water.

(c) These rules establish treatment technique requirements in lieu of maximum contaminant levels for giardia lamblia, viruses, heterotrophic plate count bacteria, legionella, cryptosporidium, and turbidity.

(d) The owner of a public water system serving at least 10,000 people shall comply with the requirements in:

(1) Env-Ws 380.04;

(2) Env-Ws 380.23;

(3) Env-Ws 380.24

(4) Env-Ws 380.25

(5) Env-Ws 380.26;

(6) Env-Ws 380.27; and

(7) Env-Ws 380.28.

(e) As required by 40 CFR 141.70(e), beginning January 1, 2005, the owner of a public water system serving fewer than 10,000 people shall comply with the requirements listed in (d), above.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); amd by #7754, eff 8-21-02; ss by #8352, eff 5-14-05

Env-Ws 380.04 Filtration Applicability and Efficacy.

(a) The owner of a public water system using SW/GWUDISW shall provide treatment of that source water in compliance with the treatment technique requirements.

(b) The treatment technique requirements shall consist of installing and properly operating water treatment processes which achieve the following:

(1) At least 99.9 percent removal or inactivation, or both, of giardia lamblia cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and

(2) At least 99.99 percent removal or inactivation, or both, of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

(c) The owner of a public water system using a SW/GWUDISW is considered to be in compliance with the requirements of paragraph (a) and (b) of this section if it meets:

(1) The requirements for avoiding filtration in Env-Ws 380.05 through Env-Ws 380.08 and the disinfection requirements in Env-Ws 380.09 through Env-Ws 380.10; or

(2) The filtration requirements in Env-Ws 380.12 and the disinfection requirements in Env-Ws 380.11.

(d) Any public water system using a SW/GWUDISW shall be operated only by operators certified pursuant to Env-Ws 367.

(e) The owner of a public water system shall submit a management plan to the department for review and approval prior to any new installation of filtration for surface water. The management plan shall demonstrate the financial and administrative capability of the water system to construct the filtration facilities and to operate the facilities on a continuous basis. Adequacy of this plan in light of the capabilities of the water system shall be a criterion for approval of the filtration proposal by the department. Failing a demonstration of financial or administrative capability, the water system shall seek other feasible options for the supply of drinking water.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05

Env-Ws 380.05 Criteria for Avoiding Filtration.

(a) The department shall determine which public water systems use groundwater under the direct influence of surface water.

(b) The department shall determine in the case of each public water system that is a SW/GWUDISW whether filtration is required. This determination shall be based on the criteria in Env-Ws 380.06 through Env-Ws 380.07.

(c) The owner of a public water system that uses a surface water source shall meet all of the conditions of Env-Ws 380.06 through Env-Ws 380.07, and shall be subject to Env-Ws 380.08, unless the department has determined that filtration is required. If the department determines that filtration is required the department shall notify the system in writing. The system shall install filtration and meet the criteria for filtered systems specified in Env-Ws 380.11 and Env-Ws 380.12.

(d) The owner of a public water system that uses a ground-water source under the direct influence of surface water shall meet all of the conditions of Env-Ws 380.06 through Env-Ws 380.07, and shall be subject to Env-Ws 380.08, unless the department has determined that filtration is required. If the department determines that filtration is required**,** the department shall notify the system in writing. The system shall install filtration and meet the criteria for filtered systems specified in Env-Ws 380.11 through Env-Ws 380.12.

(e) Within 18 months of the failure of a system using SW/GWUDISW to meet any one of the requirements of Env-Ws 380.06 through Env-Ws 380.07, the owner shall install filtration and meet the criteria for filtered systems specified in Env-Ws 380.11 through Env-Ws 380. 12.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); amd by #7754, eff 8-21-02

Env-Ws 380.06 Criteria for Avoiding Filtration Involving Source Water Quality Conditions.

(a) The fecal coliform concentration shall be equal to or less than 20/100 ml, or the total coliform concentration shall be equal to or less than 100/100 ml in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90 percent of the measurements made for the 6 previous months that the system served water to the public on an ongoing basis. If a system measures both fecal and total coliforms, the fecal coliform criterion, but not the total coliform criterion, in this paragraph shall be met.

(b) The turbidity level shall not exceed 5 NTU in representative samples of the source water immediately prior to the first or only point of disinfectant application unless:

(1) Any such high turbidity event was caused by circumstances that were unusual and unpredictable; and

(2) As a result of any such high turbidity event, there have not been more than 2 high turbidity events in the past 12 months during which the system served water to the public, or more than 5 high turbidity events in the past 120 months during which the system served water to the public, in which the turbidity level exceeded 5 NTU.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.05)

Env-Ws 380.07 Criteria for Avoiding Filtration Involving Site-Specific Conditions.

(a) The owner of a public water system shall meet the requirements of Env-Ws 380.10(a)(1) through (3) at least 11 of the 12 previous months that the system served water to the public, on an ongoing basis, unless the system fails to meet the requirements during 2 of the 12 previous months that the system served water to the public, and at least one of these failures was caused by circumstances that were unusual and unpredictable.

(b) The owner of a public water system shall meet the requirements of Env-Ws 380.10(a)(4) at all times during which the system serves water to the public.

(c) The owner of a public water system shall meet the requirements of Env-Ws 380.10(a)(5) at all times during which the system serves water to the public unless any such failure was caused by circumstances that were unusual and unpredictable.

(d) The owner of a public water system shall meet the requirements of Env-Ws 380.10(b) on an ongoing basis unless that failure to meet these requirements was not caused by a deficiency in treatment of the source water.

(e) The owner of a public water system shall maintain a watershed control program which minimizes the potential for contamination by giardia lamblia cysts and viruses in the source water.

(f) The department shall determine whether the watershed control program proposed pursuant to (e), above, is adequate to meet this goal with the following criteria:

(1) The adequacy of a program to limit potential contamination by giardia lamblia cysts and viruses as follows:

a. The comprehensiveness of the watershed review;

b. The effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and

c. The extent to which the water system has maximized land ownership controlled land use within the watershed;

(2) The content of the watershed control program, which shall:

a. Characterize the watershed hydrology and land ownership;

b. Identify watershed characteristics and activities which might have an adverse effect on source water quality; and

c. Monitor the occurrence of activities which might have an adverse effect on source water quality;

(3) The capability of the public water system, through ownership, written agreements, or both, with landowners within the watershed, to control all human activities which might have an adverse impact on the microbiological quality of the source water;

(4) The submission of an annual report to the department that:

a. Identifies any special concerns about the watershed and how they are being handled;

b. Describes activities in the watershed that affect water quality; and

c. Projects what adverse activities are expected to occur in the future and describes how the public water system expects to address them.

(g) The public water system shall be subject to an annual on-site inspection to assess the watershed control program and disinfection treatment process.

(h) The department shall conduct the on-site inspection, which shall include the following:

(1) A review of the effectiveness of the watershed control program;

(2) A review of the physical condition of the source intake and how well it is protected;

(3) A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process;

(4) An inspection of the disinfection equipment for physical deterioration;

(5) A review of operating procedures to ensure that the water system provides for uninterrupted disinfection;

(6) A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and

(7) Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection;

(i) The public water system shall not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system shall have been modified sufficiently to prevent another such occurrence, as determined by the department. A determination of the adequacy of modifications shall be based on design standards as set forth in Env-Ws 375.01.

(j) The public water system shall comply with the maximum contaminant level for total coliforms in Env-Ws 315.01 at least 11 months of the 12 previous months that the system served water to the public, on an ongoing basis, unless the department determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water. A determination of the adequacy of treatment of the source water shall be based on design standards as set forth in Env-Ws 375.01.

(k) The owner of a public water system shall comply with the requirements for total trihalomethanes (TTHM), haloacetic acid compounds (HAA5), bromate, chlorite, chlorine, chloramines, and chlorine dioxide as specified in Env-Ws 382.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.05)

Env-Ws 380.08 Treatment Technique Requirement Violations for Systems Which Avoid Filtration.

(a) A system shall be in violation of a treatment technique requirement if:

(1) The system fails to meet any one of the criteria in Env-Ws 380.06 through Env-Ws 380.07 the department has determined that filtration is required according to Env-Ws 380.05 (b), in writing;

(2) The system fails to install filtration by the date specified in Env-Ws 380.05; and

(3) The system fails to meet the requirement of Env-Ws 380.10.

(b) A system that has not installed filtration shall be in violation of a treatment technique requirement if:

(1) The turbidity level in a representative sample of the source water immediately prior to the first or only point of disinfection application exceeds 5 NTU; or

(2) The system is identified by the department as a source of a waterborne disease outbreak based on an investigation of the timing of onset, pattern and duration of reported incidence, and identified coincidental operational events of the water system associated with the waterborne disease outbreak.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.05)

Env-Ws 380.09 Disinfection.

(a) A public water system owner that uses a surface water source and does not provide filtration treatment shall provide the disinfection treatment specified in Env-Ws 380.10, unless the department determines that filtration is required pursuant to Env-Ws 380.05.

(b) A public water system that uses a ground-water source under the direct influence of surface water and does not provide filtration treatment shall provide disinfection treatment specified in Env-Ws 380.10 unless the department has determined that filtration is required pursuant to Env-Ws 380.05.

(c) A system that uses a surface water source that provides filtration treatment shall provide the disinfection treatment specified in Env-Ws 380.11.

(d) A system that uses a groundwater source under the direct influence of surface water and provides filtration treatment shall provide disinfection treatment as specified in Env-Ws 380.11.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.15)

Env-Ws 380.10 Disinfection for Systems Not Providing Filtration.

(a) Each public water system owner that does not provide filtration treatment shall provide disinfection treatment as follows:

(1) The disinfection treatment shall be sufficient to ensure at least 99.9 percent inactivation of giardia lamblia cysts and 99.99 percent inactivation of viruses, every day the system serves water to the public, except any one day each month;

(2) Each day a system serves water to the public, the owner shall calculate the CT value(s) from the system's treatment parameters, using the procedure specified in Env-Ws 380.14(f) and (g), and determine whether this value(s) is sufficient to achieve the specified inactivation rates for giardia lamblia cysts and viruses;

(3) If a system uses a disinfectant other than chlorine, the owner shall demonstrate to the department, through the use of on-site disinfection challenge studies or other information, that CT99.9 values other than those specified in Tables 380-8 and 380-9 or other operational parameters are adequate to demonstrate that the system is achieving minimum inactivation rates required by this paragraph;

(4) The disinfection system shall have redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system;

(5) The residual disinfectant concentration in the water entering the distribution system shall not be less than 0.2 mg/l for more than 4 hours.

(b) The residual disinfectant concentration in the distribution system shall be as follows:

(1) The residual disinfectant concentration measured as total chlorine, combined chlorine, or chlorine dioxide shall not be undetectable in more than 5 percent of the samples each month, for any 2 consecutive months that the system serves water to the public;

(2) Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as HPC, is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement;

(3) The value "V" in the following formula shall be calculated each month:

$$V = \frac{c + d + e}{a + b} \times 100$$

(4) The terms in the formula in (b)(3) above shall be as follows:

a. a = number of instances where the residual disinfectant concentration is measured;

b. b = number of instances where the residual disinfectant concentration is not measured but HPC is measured;

c. c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d. d = number of instances where the residual disinfectant concentration is measured but not detected and where the HPC is >500/ml; and

e. e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml; and

(5) The value of "V" in (b)(3) above shall not exceed 5 percent in one month for any 2 consecutive months.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.15)

Env-Ws 380.11 Disinfection Requirements for Systems Providing Filtration. Each owner of a public water system that provides filtration treatment shall provide disinfection treatment as follows:

(a) The disinfection treatment shall be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent inactivation or removal of giardia lamblia cysts, or both, and at least 99.99 percent inactivation and removal of viruses;

(b) The residual disinfectant concentration in the water entering the distribution system shall not be less than 0.2 mg/l for more than 4 hours;

(c) The residual disinfectant concentration shall be as follows:

(1) The residual disinfectant concentration measured as total chlorine, combined chlorine, or chlorine dioxide, shall not be undetectable in more than 5 percent of the samples each month, for any 2 consecutive months that the system serves water to the public;

(2) Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as HPC, shall be deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement;

(3) The value "V" in the following formula shall be calculated each month:

$$V = \frac{c + d + e}{a + b} \times 100$$

(4) The terms in the formula in (c)(3) above shall be as follows:

a. a = number of instances where the residual disinfectant concentration is measured;

b. b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count is measured;

c. c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d. d = number of instances where residual disinfectant concentration is measured but not detected and where the HPC is >500/ml; and

e. e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml; and

(5) The value of "V" in 3 above shall not exceed 5 percent in one month for any 2 consecutive months.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.15)

Env-Ws 380.12 Filtration.

(a) A public water system owner that uses a SW/GWUDISW, and does not meet all of the criteria in Env-Ws 380.06 and Env-Ws 380.07 for avoiding filtration, shall provide treatment consisting of both disinfection, as specified in Env-Ws 380.11, and filtration treatment which complies with the requirements of (b), (c), (d), or (e) below. Failure to meet any requirement of this section shall be a treatment technique violation.

(b) For a public water system owner using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 0.5 NTU in at least 95% of the measurements taken each month. The turbidity level of representative samples of a system's filtered water shall not exceed 5 NTU.

(c) For a systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month. The turbidity level of representative samples of a system's filtered water shall at no time exceed 5 NTU.

(d) For a systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month. The turbidity level of representative samples of a system's filtered water shall at no time exceed 5 NTU.

(e) The owner of a public water system may use a filtration technology not listed in (b) through (d) above if the owner demonstrates to the department, using pilot plant studies, that:

(1) The alternate filtration technology, in combination with disinfection treatment that meets the requirements of Env-Ws 380.11, consistently achieves 99.9% removal of giardia lamblia, inactivation of giardia lamblia cysts, or both; and

(2) The treatment removes 99.99% of viruses, inactivates viruses, or both.

(f) For a system that demonstrates the requirements in (e) above, the requirements in (c) above shall apply.

(g) The owner of a system serving at least 10,000 people shall meet:

(1) The requirements for other filtration technologies set forth in Env-Ws 380.23; and

(2) The turbidity requirements set forth in Env-Ws 380.27.

(h) As required by 40 CFR 141.70(a)(4), beginning January 1, 2005, the owner of a public water system serving fewer than 10,000 people shall comply with the requirements listed in (g), above.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly Env-Ws 380.20)

Env-Ws 380.13 Analytical Requirements.

(a) The analytical methods specified in 40 CFR 141.74 shall be used to comply with the requirements of Env-Ws 380 for the following parameters:

(1) Fecal coliform concentration;

(2) Total coliform concentration;

(3) Heterotrophic plate count;

(4) Residual disinfectant concentration;

(5) Turbidity;

(6) Temperature; and

(7) pH.

(b) Operators certified under Env-Ws 367 shall conduct measurements for pH, temperature, turbidity, and residual disinfectant concentration.

(c) Measurements for total coliforms, fecal coliforms, and HPC shall be conducted by a laboratory accredited to do such analysis by the department under Env-C 300.

(d) Until laboratory accreditation criteria are developed for the analysis of HPC and fecal coliforms, any laboratory certified for total coliform analysis under Env-C 300 shall be deemed certified for HPC and fecal coliform analysis.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly Env-Ws 380.21)

Env-Ws 380.14 Monitoring Requirements for Systems That Do Not Provide Filtration.

(a) The owner of a public water system that uses a surface water source and does not provide filtration treatment shall monitor as specified in this section.

(b) The owner of a public water system that uses a ground-water source under the direct influence of surface water and does not provide filtration treatment shall monitor as specified in this section beginning 6 months after the department determines that the ground–water source is under the direct influence of surface water unless the department has determined that filtration is required pursuant to Env-Ws 380.04, in which case the system shall monitor according to Env-Ws 375.10 until filtration is in place.

(c) Fecal coliform or total coliform density measurements shall be performed on representative source water samples immediately prior to the first or only point of disinfectant application as follows:

(1) Each week the system serves water to the public, the system shall sample for fecal or total coliforms at the minimum frequency specified in Table 380-1:

Table 380-1

Sampling Non-filtered Systems for Coliforms

| System Size (persons served) (shall be taken on separate days) | Samples/Week |
|---|---|
| <500 | 1 |
| 501 - 3,300 | 2 |
| 3,301 - 10,000 | 3 |
| 10,001 - 25,000 | 4 |
| >25,000 | 5 |

(2) One fecal or total coliform density measurement shall be made every day the system serves water to the public and the turbidity of the source water exceeds 1 NTU; and

(3) The fecal or total coliform density measurements made according to (2) shall count toward the weekly coliform sampling requirement required by (1).

(d) Turbidity measurements as required by Env-Ws 380.06 shall be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every 4 hours, or more frequently, that the system serves water to the public.

(e) A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol recommended by the equipment manufacturer.

(f) The total inactivation ratio for each day that the system is in operation shall be determined based on the CT99.9 values in Tables 380-2 through Table 380-9 of Env-Ws 380.15, as applicable.

(g) The parameters necessary to determine the total inactivation ratio shall be monitored as follows:

(1) The temperature of the disinfected water shall be measured at least once per day at each residual disinfectant concentration sampling point;

(2) If the system uses chlorine, the pH of the disinfected water shall be measured at least once per day at each chlorine residual disinfectant concentration sampling point;

(3) The disinfectant contact time(s) shall be determined for each day during peak hourly flow;

(4) The residual disinfectant concentration(s) of the water before or at the first customer shall be measured each day during peak hourly flow;

(5) If a system uses a disinfectant other than chlorine, the system shall demonstrate to the department, through the use of on-site disinfection challenge studies or other information that CT99.9 values other than those specified in Tables 380-8 and 380-9 in this section other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by Env-Ws 380.10;

(6) The CT values in Tables 380-2 through 380-7 shall be assumed to achieve greater than a 99.99 percent inactivation of viruses;

(7) CT values between the indicated pH values shall be determined by linear interpolation;

(8) CT values between the indicated temperatures of different tables shall be determined by linear interpolation;

(9) If no interpolation is used, the CT99.9 value at the lower temperature and at the higher pH shall be used;

(10) The CT values in Table 380-8 shall be assumed to achieve greater than 99.99 percent inactivation of viruses;

(11) CT values between the indicated temperatures shall be determined by linear interpolation;

(12) If no interpolation is used, the CT99.9 value at the lower temperature in Table 380-8 for determining CT99.9 values between indicated temperatures shall be used;

(13) The CT values in Table 380-9 shall be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia; and

(h) If the condition is not met as specified in (g) above, the system owner shall demonstrate, based on on-site studies or other information that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures shall be determined by linear interpolation. If no interpolation is used, the CT99.9 value at the lower temperature for determining CT99.9 values between indicated temperatures shall be used.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.22)

Env-Ws 380.15 CT Values for Inactivation of Giardia Lamblia Cysts.

(a) The CT values for giardia lamblia cysts inactivation by free chlorine at 0.5°C or lower shall be as stated in Table 380-2 below:

Table 380-2

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION
OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5°C OR LOWER

| | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| Residual (mg/l) | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| <0.4 | 137 | 163 | 195 | 237 | 277 | 329 | 390 |
| 0.6 | 141 | 168 | 200 | 239 | 286 | 342 | 407 |
| 0.8 | 145 | 172 | 205 | 246 | 295 | 354 | 422 |
| 1.0 | 148 | 176 | 210 | 253 | 304 | 365 | 437 |
| 1.2 | 152 | 180 | 215 | 259 | 313 | 376 | 451 |
| 1.4 | 155 | 184 | 221 | 266 | 321 | 387 | 464 |
| 1.6 | 157 | 189 | 226 | 273 | 329 | 397 | 477 |
| 1.8 | 162 | 193 | 231 | 279 | 338 | 407 | 489 |
| 2.0 | 165 | 197 | 236 | 286 | 346 | 417 | 500 |
| 2.2 | 169 | 201 | 242 | 297 | 353 | 426 | 511 |
| 2.4 | 172 | 205 | 247 | 298 | 361 | 435 | 522 |
| 2.6 | 175 | 209 | 252 | 304 | 368 | 444 | 533 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.8 | 178 | 213 | 257 | 310 | 375 | 452 | 543 |
| 3.0 | 181 | 217 | 261 | 316 | 382 | 460 | 552 |

(b) The CT values for giardia lamblia cysts inactivated by free chlorine at 5.0°C shall be as stated in Table 380-3 below:

Table 380-3

CT VALUES (CT 99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 5.0°C

| | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| Free Residual (mg/l) | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| <0.4 | 97 | 117 | 139 | 166 | 198 | 236 | 279 |
| 0.6 | 100 | 120 | 143 | 171 | 204 | 244 | 291 |
| 0.8 | 103 | 122 | 146 | 175 | 210 | 252 | 301 |
| 1.0 | 105 | 125 | 149 | 179 | 216 | 260 | 312 |
| 1.2 | 107 | 127 | 152 | 183 | 221 | 267 | 320 |
| 1.4 | 109 | 130 | 155 | 187 | 227 | 274 | 329 |
| 1.6 | 111 | 132 | 158 | 192 | 232 | 281 | 337 |
| 1.8 | 114 | 135 | 162 | 196 | 238 | 287 | 345 |
| 2.0 | 116 | 138 | 165 | 200 | 243 | 294 | 353 |
| 2.2 | 118 | 140 | 169 | 204 | 248 | 300 | 361 |
| 2.4 | 120 | 143 | 172 | 209 | 253 | 306 | 368 |
| 2.6 | 122 | 146 | 175 | 213 | 258 | 312 | 375 |
| 2.8 | 124 | 148 | 178 | 217 | 263 | 318 | 382 |
| 3.0 | 126 | 151 | 182 | 221 | 268 | 324 | 389 |

(c) The CT values for giardia lamblia cysts inactivated by free chlorine at 10°C shall be as stated in Table 380-4 below:

Table 380-4

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 10°C

| | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| Free Residual (mg/l) | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| <0.4 | 73 | 88 | 104 | 125 | 149 | 177 | 209 |
| 0.6 | 75 | 90 | 107 | 128 | 153 | 182 | 218 |
| 0.8 | 78 | 92 | 110 | 131 | 158 | 189 | 226 |
| 1.0 | 79 | 94 | 112 | 134 | 162 | 195 | 234 |
| 1.2 | 80 | 95 | 112 | 134 | 162 | 195 | 234 |
| 1.4 | 82 | 98 | 116 | 140 | 170 | 206 | 247 |
| 1.6 | 83 | 99 | 119 | 144 | 174 | 211 | 253 |
| 1.8 | 86 | 101 | 122 | 147 | 179 | 215 | 259 |
| 2.0 | 87 | 104 | 124 | 150 | 182 | 221 | 265 |
| 2.2 | 89 | 105 | 127 | 153 | 186 | 225 | 271 |
| 2.4 | 90 | 107 | 129 | 157 | 190 | 230 | 276 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.6 | 92 | 110 | 131 | 160 | 194 | 234 | 281 |
| 2.8 | 93 | 111 | 134 | 163 | 197 | 239 | 287 |
| 3.0 | 95 | 113 | 137 | 166 | 201 | 243 | 292 |

(d) The CT value for giardia lamblia cysts inactivated by free chlorine at 15°C shall be as stated in Table 380-5 below:

Table 380-5

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 15 º C

| | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| Free Residual (mg/l) | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| <0.4 | 49 | 59 | 71 | 83 | 99 | 118 | 140 |
| 0.6 | 50 | 60 | 72 | 86 | 102 | 122 | 146 |
| 0.8 | 52 | 61 | 73 | 88 | 105 | 126 | 151 |
| 1.0 | 53 | 63 | 75 | 90 | 108 | 130 | 156 |
| 1.2 | 54 | 64 | 76 | 92 | 111 | 134 | 160 |
| 1.4 | 55 | 65 | 78 | 94 | 114 | 137 | 165 |
| 1.6 | 56 | 66 | 79 | 96 | 116 | 141 | 169 |
| 1.8 | 57 | 68 | 81 | 98 | 119 | 144 | 173 |
| 2.0 | 58 | 69 | 83 | 100 | 122 | 147 | 177 |
| 2.2 | 59 | 70 | 85 | 102 | 124 | 150 | 181 |
| 2.4 | 60 | 72 | 86 | 105 | 127 | 153 | 184 |
| 2.6 | 61 | 73 | 88 | 107 | 129 | 156 | 188 |
| 2.8 | 62 | 74 | 89 | 109 | 132 | 159 | 191 |
| 3.0 | 63 | 76 | 91 | 111 | 134 | 162 | 195 |

(e) The CT value for giardia lamblia cysts inactivated by free chlorine at 20°C shall be as stated in Table 380-6 below:

Table 380-6

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 20°C

| | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| Free Residual (mg/l) | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| <0.4 | 49 | 59 | 71 | 83 | 99 | 118 | 140 |
| 0.6 | 50 | 60 | 72 | 86 | 102 | 122 | 146 |
| 0.8 | 52 | 61 | 73 | 88 | 105 | 126 | 151 |
| 1.0 | 53 | 63 | 75 | 90 | 108 | 130 | 156 |
| 1.2 | 54 | 64 | 76 | 92 | 111 | 134 | 160 |
| 1.4 | 55 | 65 | 78 | 94 | 114 | 137 | 165 |
| 1.6 | 56 | 66 | 79 | 96 | 116 | 141 | 169 |
| 1.8 | 57 | 68 | 81 | 98 | 119 | 144 | 173 |
| 2.0 | 58 | 69 | 83 | 100 | 122 | 147 | 177 |
| 2.2 | 59 | 70 | 85 | 102 | 124 | 150 | 181 |
| 2.4 | 61 | 72 | 86 | 105 | 127 | 153 | 184 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2.6 | 61 | 73 | 88 | 107 | 129 | 156 | 188 |
| 2.8 | 62 | 74 | 89 | 109 | 132 | 159 | 191 |
| 3.0 | 63 | 76 | 91 | 111 | 134 | 162 | 195 |

(f) The CT for giardia lamblia cysts inactivated by free chlorine at 25°C shall be as stated in Table 380-7 below:

Table 380-7

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 25°C AND HIGHER

| | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| Free Residual (mg/l) | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| <0.4 | 24 | 29 | 35 | 42 | 50 | 59 | 70 |
| 0.6 | 25 | 30 | 36 | 43 | 51 | 61 | 73 |
| 0.8 | 26 | 31 | 37 | 44 | 53 | 63 | 75 |
| 1.0 | 26 | 31 | 37 | 45 | 54 | 65 | 78 |
| 1.2 | 27 | 32 | 38 | 46 | 55 | 67 | 80 |
| 1.4 | 27 | 33 | 39 | 47 | 57 | 69 | 82 |
| 1.6 | 28 | 33 | 40 | 48 | 58 | 70 | 84 |
| 1.8 | 29 | 34 | 41 | 49 | 60 | 72 | 86 |
| 2.0 | 29 | 35 | 41 | 50 | 61 | 74 | 88 |
| 2.2 | 30 | 35 | 42 | 51 | 62 | 75 | 90 |
| 2.4 | 30 | 36 | 43 | 52 | 63 | 77 | 92 |
| 2.6 | 31 | 37 | 44 | 53 | 65 | 78 | 94 |
| 2.8 | 31 | 37 | 45 | 54 | 66 | 80 | 96 |
| 3.0 | 32 | 38 | 46 | 55 | 67 | 81 | 97 |

(g) The CT values for giardia lamblia cysts inactivated by chlorine dioxide and ozone shall be as stated in Table 380-8, below:

Table 380-8

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORINE DIOXIDE AND OZONE

| | Temperature | | | | | |
|---|---|---|---|---|---|---|
| | ≤1 °C | 5 °C | 10 °C | 15 °C | 20 °C | ≥25 °C |
| Chlorine dioxide | 63 | 26 | 23 | 19 | 15 | 11 |
| Ozone | 2.9 | 1.9 | 1.4 | 0.95 | 0.72 | 0.48 |

(h) The CT values for giardia lamblia cysts inactivated by chloramines at pH values 6 to 9 shall be as stated in Table 380-9 below:

Table 380-9

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORAMINES AT pH VALUES 6 TO 9

Temperature

| ≤1 °C | 5 °C | 10 °C | 15 °C | 20 °C | ≥25 °C |
|---|---|---|---|---|---|
| 3,800 | 2,200 | 1,850 | 1,500 | 1,100 | 750 |

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.22)

Env-Ws 380.16 Calculation of the Total Inactivation Ratio for Systems That Do Not Provide Filtration.

(a) If a system owner uses only one point of disinfectant application, the system owner shall determine the total inactivation ratio based on either of the following 2 methods:

(1) One inactivation ratio, Ctcalc/CT99.9, shall be determined before or at the first customer during peak hourly flow and if the Ctcalc/CT99.9 > 1.0, the 99.9 percent Giardia lamblia inactivation requirement has been achieved; or

(2) Successive Ctcalc/CT99.9 values, representing sequential inactivation ratios, shall be determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow.

(b) Under (a) above, the following method shall be used to calculate the total inactivation ratio:

(1) The (Ctcalc/CT99.9) shall be determined for each sequence;

(2) The (Ctcalc/CT99.9) values shall be added together ∑(Ctcalc/CT99.9); and

(3) If ∑ (Ctcalc/CT99.9) > 1.0, the 99.9 percent giardia lamblia inactivation requirement shall have been achieved.

(c) If the system owner uses more than one point of disinfectant application before or at the first customer, the system owner shall determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The Ctcalc/CT99.9 value of each sequence and ∑ (Ctcalc/CT99.9) shall be calculated using the method in (b) (1) through (3) above to determine if the system owner is in compliance with Env-Ws 380.10.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.22)

Env-Ws 380.17 Monitoring of Residual Disinfectant Concentration for Systems That Do Not Provide Filtration.

(a) The residual disinfectant concentration of the water entering the distribution system shall be monitored continuously, and the lowest value shall be recorded each day.

(b) If there is a failure in the continuous monitoring equipment, the system owner shall conduct grab sampling every 4 hours in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment.

(c) A system serving 3,300 or fewer people may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies prescribed in Table 380-10 below:

Table 380-10
Disinfectant Residual Samples For Unfiltered Systems

| System by population | Samples/day |
|---|---|
| <500 | 1 |
| 501 - 1,000 | 2 |
| 1,001 – 2,500 | 3 |
| 2,501 – 3,300 | 4 |

(d) The day's samples taken according to (c) shall not be taken at the same time; and

(e) If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system shall take a grab sample every 4 hours until the residual concentration is equal to or greater than 0.2 mg/l.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.22)

Env-Ws 380.18 Monitoring of Residual Disinfectant in the Distribution System for Systems That Do Not Provide Filtration.

(a) The residual disinfectant concentration shall measure at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Env-Ws 325.02.

(b) A public water system which uses both a SW/GWUDISW, and a ground-water source, may take disinfectant residual samples at points other than the total coliform sampling points if the department determines that such points are more representative of disinfected water quality within the distribution system.

(c) The department shall make the determination of whether alternate sampling points are more representative of disinfected water quality within the distribution system based on the following criteria:

(1) The general hydraulics of the distribution system based on water demand patterns;

(2) The relative quantity of water supplied from the various water sources;

(3) The scheduling of supply from pumped sources; and

(4) Historic disinfectant concentration at various locations in the distribution system as determined from water supply records.

(d) Heterotrophic bacteria, measured as heterotrophic plate count may be measured in lieu of residual disinfectant concentration.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.22)

Env-Ws 380.19 Monitoring Requirements for Systems Using Filtration Treatment.

(a) The owner of a public water system that uses a SW/GWUDISW and provides filtration treatment shall monitor in accordance with this section.

(b) Turbidity measurements shall be as follows:

(1) The measurement as required by Env-Ws 380.12 shall be performed on representative samples of the system's filtered water at least every 4 hours, that the system serves water to the public;

(2) A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol recommended by the equipment manufacturer;

(3) For a systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the department shall reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance;

(4) For a system serving 500 or fewer people, the department shall reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the department determines that less frequent monitoring is sufficient to indicate effective filtration performance;

(5) The determination of sufficiency of less frequent monitoring in sections (3) and (4) shall be based on the following criteria:

a. The capability of the water system owner to maintain residual disinfectant concentration in water entering the distribution system in accordance with Env-Ws 380.11;

b. The capability of the water system owner to maintain detectable residual disinfectant concentration in the distribution system or otherwise comply with the requirements of Env-Ws 380.11; and

c. The capability of the water system owner to meet the turbidity requirements of Env-Ws 380.12.

(c) The residual disinfectant concentration of the water entering the distribution system shall be monitored as follows:

(1) The residual shall be monitored continuously, and the lowest value shall be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours shall be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment;

(2) Systems serving 3,300 or fewer people may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed in Table 380-11 below:

Table 380-11

Disinfectant Residual Sampling For Filtered Systems

| System size by population | Samples/day |
|---|---|

| | |
|---|---|
| <500 | 1 |
| 501 – 1,000 | 2 |
| 1,001 – 2,500 | 3 |
| 2,501 – 3,300 | 4 |

(3) The day's samples taken according to (2) above shall not be taken at the same time; and

(4) If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system owner shall take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/l.

(d) The residual disinfectant concentration in the distribution system shall be monitored as follows:

(1) The residual disinfectant concentration shall be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Env-Ws 325.02, except that a public water system which uses both a SW/GWUDISW, and a ground–water source, may take disinfectant residual samples at points other than the total coliform sampling points if the department determines that such points are more representative of disinfected water quality within the distribution system;

(2) The department shall make the determination of whether alternate sampling points are more representative of disinfected water quality within the distribution system based on the following criteria:

a. The general hydraulics of the distribution system based on water demand patterns;

b. The relative quantity of water supplied from the various water sources;

c. The scheduling of supply from pumped sources; and

d. Historic disinfectant concentration at various locations in the distribution system as determined from water supply records; and

(3) Heterotrophic bacteria, measured as heterotrophic plate count may be measured in lieu of residual disinfectant concentration.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.22)

Env-Ws 380.20 Reporting and Recordkeeping Requirements for Systems Not Using Filtration. Reporting and recordkeeping requirements for system owners that do not provide filtration shall be as follows:

(a) A public water system owner that uses a surface water source and does not provide filtration treatment shall report monthly to the department the information specified below.

(b) A public water system owner that uses a ground–water source under the direct influence of surface water and does not provide filtration treatment shall report monthly to the department the information specified below beginning 6 months after the department determines that the ground–water source is under the direct influence of surface water;

(c) Source water quality information shall be reported to the department within 10 days after the end of each month that the system serves water to the public as follows:

(1) The cumulative number of months for which results are reported;

(2) The number of fecal and total coliform samples, or both, whichever are analyzed during the month, the dates of sample collection, and the dates when the turbidity level exceeded 1 NTU;

(3) If a system owner monitors for both fecal coliforms and total coliforms, only fecal coliforms shall be reported;

(4) The number of samples during the month that had equal to or less than 20/100 ml fecal coliforms and equal to or less than 100/100 ml total coliforms, whichever are analyzed;

(5) The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous 6 months the system served water to the public;

(6) The cumulative number of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous 6 months the system served water to the public;

(7) The percentage of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than l00/l00 ml total coliforms, whichever are analyzed, during the previous 6 months the system served water to the public;

(8) The maximum turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded 5 NTU, and the date(s) the occurrence(s) was reported to the department;

(9) For the first 12 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after one year of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 12 months the system served water to the public; and

(10) For the first 120 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after 10 years of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 120 months the system served water to the public;

(d) Disinfection information specified in Env-Ws 380.14 shall be reported to the department within 10 days after the end of each month the system serves water to the public as follows:

(1) For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system;

(2) The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the department was notified of the occurrence;

(3) The daily residual disinfectant concentration(s), in mg/l, and disinfectant contact time(s), in minutes, used for calculating the CT value(s);

(4) If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine disinfection;

(5) The daily measurement(s) of water temperature in °C following each point of disinfection;

(6) The daily Ctcalc and Ctcalc/CT99.9 values for each disinfectant measurement or sequence and the sum of all Ctcalc/CT99.9 values, ∑ (Ctcalc/CT99.9), before or at the first customer;

(7) The daily determination of whether disinfection achieves adequate giardia cyst and virus inactivation, where disinfectants other than chlorine are used, other indicator conditions are met;

(8) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to Env-Ws 325:

a. The number of instances where the residual disinfectant concentration is measured;

b. The number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count is measured;

c. The number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d. The number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;

e. The number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml; and

f. For the current and previous month the system served water to the public, the value of "V" calculated in Env-Ws 380.10; and

(9) A system owner need not continue to report the data listed in (d)(1) through (6) above if all data listed in paragraphs (d)(1) through (8) above remain on file at the system, and the department determines that:

a. The system owner has submitted to the department all the information required by (d)(1) through (8) of this section for at least 12 months; and

b. The system owner is not required to provide filtration treatment;

(e) No later than 10 days after the end of each calendar year, each system owner shall provide to the department a report which summarizes its compliance with all watershed control program requirements specified in Env-Ws 380.07;

(f) No later than 10 days after the end of each calendar year, the department shall provide a copy of its report on the on-site inspection conducted during that year pursuant to Env-Ws 380.07 to the public water system owner;

(g) Each system owner, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, shall report that occurrence to the department as soon as possible, but no later than by the end of the next business day after such discovery;

(h) If at any time the turbidity exceeds 5 NTU, the system owner shall inform the department as soon as possible, but no later than the end of the next business day after such discovery; and

(i) If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system owner shall notify the department:

(1) As soon as possible, but no later than by the end of the next business day after such discovery; and

(2) By the end of the next business day whether the residual was restored to at least 0.2 mg/l within 4 hours.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); amd by #7754, eff 8-21-02; ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.25)

Env-Ws 380.21 Reporting and Recordkeeping Required for Systems Using Filtration.

(a) A public water system owner that uses a SW/GWUDISW and provides filtration treatment shall report monthly to the department the turbidity measurements as required by Env-Ws 380.12 within 10 days after the end of each month the system serves water to the public**,** as follows:

(1) The total number of filtered water turbidity measurements taken during the month;

(2) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in Env-Ws 380.12 for the filtration technology being used; and

(3) The date and value of any turbidity measurements taken during the month which exceed 5 NTU.

(b) A public water system owner that uses SW/GWUDISW shall report disinfection information specified in Env-Ws 380.11 to the department within 10 days after the end of each month the system serves water to the public as follows:

(1) For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system;

(2) The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the department was notified of the occurrence; and

(3) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to Env-Ws 325:

a. The number of instances where the residual disinfectant concentration is measured;

b. The number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count is measured;

c. The number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d. The number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;

e. The number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml; and

f. For the current and previous month the system serves water to the public, the value of "V" calculated in Env-Ws 380.11.

(c) A system owner shall not be required to continue to report the data listed in (b) of this section if all data listed in (b) above remain on file at the system and the department determines that the system owner has submitted all the information required by (b)(1) through (3) above for at least 12 months.

(d) Each system owner, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, shall report that occurrence to the department as soon as possible, but no later than by the end of the next business day after such discovery.

(e) If at any time the turbidity exceeds 5 NTU, the system owner shall inform the department as soon as possible, but no later than the end of the next business day after such discovery.

(f) If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system shall notify the department as follows:

(1) As soon as possible, but no later than by the end of the next business day after such discovery; and

(2) By the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.25)

Env-Ws 380.22 Variances and Exemptions.

(a) No variances from the requirements of Env-Ws 380 shall be permitted.

(b) No exemptions from the requirements of Env-Ws 380.10 and Env-Ws 380.11 shall be permitted.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.26)

Env-Ws 380.23 Enhanced Filtration and Disinfection.

(a) Unless otherwise specified, the requirements in Env-Ws 380.23 through Env-Ws 380.28 shall apply to:

(1) SW/GWUDISW systems serving at least 10,000 people,; and

(2) Pursuant to 40 CFR 141.70(e), beginning January 1, 2005, systems serving fewer than 10,000 people.

(b) The requirements in this section shall establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants:

(1) Giardia lamblia;

(2) Viruses;

(3) Heterotrophic plate count bacteria;

(4) Legionella;

(5) Cryptosporidium; and

(6) Turbidity.

(c) The owner of a SW/GWUDISW system shall provide treatment of the source water that complies with treatment technique requirements identified in (d) below, and as specified in Env-Ws 380.04.

(d) The treatment technique requirements shall consist of installing and properly operating water treatment processes as follows:

(1) For a filtered system, at least 99%, or 2-log removal of cryptosporidium shall be achieved between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before, or at the first customer;

(2) For an unfiltered system, control of cryptosporidium shall be achieved by using the watershed control plan as specified in Env-Ws 380.23(e)(1); and

(3) Compliance with the profiling and benchmark requirements shall be achieved under the provisions of Env-Ws 380.24 through Env-Ws 380.26.

(e) The owner of a public water system subject to the requirements of this section shall be in compliance with Env-Ws 380.03(a) if:

(1) The system meets:

a. The requirements for avoiding filtration set forth in Env-Ws 380.05 through Env-Ws 380.08 and (g) through (i) below; and

b. The disinfection requirements set forth in Env-Ws 380.19 through Env-Ws 380.10 and Env-Ws 380.24 though Env-Ws 380.26; or

(2) The system meets:

a. The applicable filtration requirements set forth in Env-Ws 380.12 and Env-Ws 380.27; and

b. The disinfection requirements in Env-Ws 380.11, Env-Ws 380.24, and Env-Ws 380.25.

(f) A system owner shall not construct an uncovered finished water storage facility.

(g) In addition to the requirements of Env-Ws 380.05 through Env-Ws 380.08 , the owner of a public water system subject to the requirements of this section that does not provide filtration shall comply with the watershed control program specified in Env-Ws 380.07(e) to minimize the potential for contamination by cryptosporidium oocysts in the source water.

(h) The watershed control program identified in (g) above, shall, for cryptosporidium:

(1) Identify watershed characteristics and activities which might have an adverse effect on source water quality; and

(2) Monitor the occurrence of activities which might have an adverse effect on source water quality.

(i) During the on-site inspection conducted under Env-Ws 380.07(g), the department shall use the criteria specified in Env-Ws 380.07(e)(1) through (4) to determine whether the watershed control program established under Env-Ws 380.07(e) is adequate.

(j) As required by 40 CFR 141.70(e), a SW/GWUDISW system that served fewer than 10,000 people as of January 1, 2002, but served at least 10,000 people as of January 1, 2005, shall:

(1) Comply with all the requirements in Env-Ws 380.23 through 380.27 for systems serving at least 10,000 people;

(2) Consult with the department to establish a disinfection benchmark; and

(3) If a significant change is made to the disinfection practice, consult with the department prior to making such change as specified in Env-Ws 380.24.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly Env-Ws 380.27)

Env-Ws 380.24 Disinfection Profiling for Systems Which Serve at Least 10,000 People.

(a) The owner of a public water system subject to the requirements of Env-Ws 380.23 and which serves at least 10,000 people shall comply with the requirements in this section and Env-Ws 380.26.

(b) The system owner shall determine:

(1) The TTHM annual average using the procedure specified in (c) below; and

(2) The HAA5 annual average using the procedure specified in (d) below.

(c) The TTHM annual average shall be calculated during the same period as the HAA5 annual average and be based on the following:

(1) A system owner collecting data under the provisions of 40 CFR 141 Subpart M, July 1, 2000 edition shall use the results of the samples collected during the last 4 quarters of required monitoring;

(2) A system owner using HAA5 occurrence data that meet the provisions of (d)(2) below, shall use TTHM data collected at the same time under the requirements of Env-Ws 317.70 and Env-Ws 327.70; and

(3) A system owner using HAA5 occurrence data that meet the provisions of (e)(1) or (2) below, shall use TTHM data collected at the same time under the provisions of Env-Ws 317.70 and Env-Ws 327.70.

(d) The HAA5 annual average shall be:

(1) The annual average during the same period as the TTHM annual average; and

(2) Based on the following:

a. A system owner collecting data under the provisions of 40 CFR 141 Subpart M, July 1, 2000 edition, shall use the results of the samples collected during the last 4 quarters of required monitoring; and

b. A system owner collecting 4 quarters of HAA5 occurrence data that meets the routine monitoring sample number and location requirements for TTHM set forth in Env-Ws 317.70 and Env-Ws 327.70, and the handling and analytical method requirements of Env-Ws 382.06, shall use those data to determine whether the requirements of this section apply.

(e) A system owner who fails to collect the HAA5 data specified in (d) above shall:

(1) Conduct monitoring for HAA5 that meets the routine monitoring sample number and location requirements for TTHM set forth in Env-Ws 317.70 and Env-Ws 327.70 and the handling and analytical method requirements of Env-Ws 382.06 to determine the HAA5 annual average and whether the requirements of (l) below apply; or

(2) Comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with (l) below.

(f) If the department determines that the data set determined under (c) or (d) above is not representative, the department shall require that a system owner use a more representative annual data set for the purpose of determining applicability of the requirements of this section. The determination that a more representative data set is needed shall be based on the following criteria.

(1) Water quality reported to the department pursuant to administrative rules Env-Ws 380 shall be reviewed to determine a divergence in treated water quality during the period represented by the data set from the norm.

(2) The location of the sampling points in the data set shall be reviewed to determine whether the points are uniformly distributed throughout the water delivery system.

(g) The department shall approve the data set offered in place of the data set determined under (c) or (d) above if it determines that the data set is more representative of actual system performance and is equivalent to the data set collected under the criteria specified in (c) or (d) above.

(h) A system owner shall submit the following data to the department:

(1) A system owner collecting TTHM and HAA5 data under the provisions of 40 CFR 141 Subpart M, July 1, 2000 edition, as required by (c)(1) and (d)(1) above, shall submit the results of the samples collected during the last 12 months of required monitoring;

(2) A system owner collecting 4 consecutive quarters of HAA5 occurrence data that meet the routine monitoring sample number and location for TTHM in Env-Ws 317.70 and Env-Ws 327.70 and the handling and analytical method requirements of Env-Ws 382.06 as allowed by (c)(2) and (d)(1) above, shall submit that data; and

(3) A system owner conducting monitoring for HAA5 using the monitoring requirements specified by (c)(3) and (e)(1) above shall submit TTHM and HAA5 data.

(i) A system owner electing to comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with this section, as allowed under (e)(2) above, shall notify the department in writing of the election.

(j) Until the department has approved the data identified in (i) above, the system owner shall conduct monitoring for HAA5 using the monitoring requirements specified under (d) above.

(k) A system having either a TTHM annual average greater than or equal to 0.064 mg/L or an HAA5 annual average greater than or equal to 0.048 mg/L during the same monitoring period specified in (c) above shall conduct disinfection profiling as follows:

(1) A system owner shall develop a disinfection profile of its disinfection practice for a period of up to 3 years;

(2) A system owner shall monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation, expressed as log inactivation, for each day of operation, based on the CT99.9 values specified in Tables 380-2 through 380-9 as appropriate, through the entire treatment plant;

(3) A system owner shall conduct the monitoring required in (2), above as follows:

a. A system with a single point of disinfectant application prior to entrance to the distribution system shall conduct the monitoring in (4) a. through d. below; and

b. A system with more than one point of disinfectant application shall conduct the monitoring in paragraphs (4) a. through d. below for each disinfection segment;

(4) A system owner shall monitor the parameters necessary to determine the total inactivation ratio, using analytical methods described in Env-Ws 380.13, as follows:

a. The temperature of the disinfected water shall be measured at least once per day at each residual disinfectant concentration sampling point during peak hourly flow;

b. If the system uses chlorine, the pH of the disinfected water shall be measured at least once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow;

c. The disinfectant contact time(s) (T) shall be determined for each day during peak hourly flow; and

d. The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfection shall be measured each day during peak hourly flow.

(l) A system owner may submit a written request to the department to use existing operational data in lieu of the monitoring conducted under the provisions of (k)(2) above.

(m) The written request shall include the following:

(1) The water system name;

(2) The water system EPA number;

(3) The most recent operational data for the past 3 years; and

(4) A profile generated using the operational data specified in (3) above.

(n) The data offered pursuant to (l) above shall be representative of giardia lamblia inactivation through the entire treatment plant and not just of certain treatment segments.

(o) The department shall accept the data offered under (l), above, if the operational data is substantially equivalent to data collected under the provisions of (k)(2).

(p) Until the department approves the request submitted pursuant to (l) above, the system owner shall conduct monitoring under the provisions of (k)(2), above.

(q) In addition to the monitoring conducted under the provisions of (k)(2) above, to develop the disinfection profile, the system owner may elect to meet the following:

(1) In addition to the disinfection profile generated under (k)(2) above, the owner of a public water system that has existing operational data may use the data to develop a disinfection profile for additional years;

(2) A system owner may use the additional yearly disinfection profiles to develop a benchmark under the provisions of Env-Ws 380.26; and

(3) The data shall be representative of inactivation through the entire treatment plant and not just of certain treatment segments.

(r) A system owner shall calculate the total inactivation ratio as follows:

(1) If a system uses only one point of disinfectant application, the system owner shall determine the total inactivation ratio for the disinfection segment by:

a. Determining one CTcalc/CT99.9 (inactivation ratio) before or at the first customer during peak hourly flow; or

b. Determining successive sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow;

(2) Under b. above, a system owner shall calculate the $\sum$ CTcalc/CT99.9 (total inactivation ratio) by determining the inactivation ratios for each sequence and then adding the inactivation ratio values together to determine the total inactivation ratio;

(3) If a system uses more than one point of disinfectant application before the first customer, the system owner shall determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow and the inactivation ratio value of each segment and the total inactivation ratio shall be calculated using the method in (1) and (2) above; and

(4) The system owner shall determine the total logs of inactivation by multiplying the value calculated in (1) or (3) above by 3.0.

(s) The owner of a system that uses either chloramines or ozone for primary disinfection shall calculate the logs of inactivation for viruses based on methods accepted by the department. Methods accepted by the department shall be based on tables for log inactivation based on published, peer-reviewed and reproducible research.

(t) The system owner shall retain disinfection profile data in the form of a graph or as a spreadsheet and have the data available when the department conducts a sanitary survey pursuant to Env-Ws 306.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.28)

Env-Ws 380.25 Disinfection Profiling for Systems Which Serve Less than 10,000 People.

(a) The owner of a community or non-transient non-community public water system subject to the requirements of Env-Ws 380.23 and which serves fewer than 10,000 people shall comply with the requirements in (b) through (d) below.

(b) The system shall develop a disinfection profile unless the department determines that the system's profile is unnecessary. The department shall determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively.

(c) In accordance with 40 CFR 141.531, to determine whether a disinfection profile is required, TTHM and HAA5 samples shall be collected as follows:

(1) After January 1, 1998;

(2) During the month with the warmest temperature; and

(3) At the point of maximum residence time in the distribution system.

(d) The department shall approve the use of a more representative data set for disinfection profiling than the data set required under Env-Ws 380.25(e).

(e) A system owner required to profile under (b) above shall conduct disinfection profiling as follows:

(1) The system owner shall develop a disinfection profile of its disinfection practice for a period of up to one year;

(2) The system owner shall monitor weekly;

(3) The system owner shall monitor on the same day of the week for a period of 52 consecutive weeks for the parameters listed in (e)(8) below to determine the total logs of inactivation, expressed as log inactivation, for each day of monitoring, based on the CT99.9 values specified in Tables 380-2 through 380-9 as applicable, through the entire treatment plant;

(4) The log inactivations shall be used to develop a disinfection profile;

(5) As required by 40 CFR 141.532(a), if a system serves between 500 and 9,999 people it shall begin to collect data no later than July 1, 2003;

(6) As required by 40 CFR 141.532(a), if a system serves fewer than 500 people it shall begin to collect data no later than January 1, 2004;

(7) The system owner shall conduct the monitoring required in (e), above as follows:

a. A system with a single point of disinfectant application prior to entrance to the distribution system shall conduct the monitoring in (e)(8) below; and

b. A system with more than one point of disinfectant application shall conduct the monitoring in (e)(8) below for each disinfection segment; and

(8) The system owner shall monitor the parameters necessary to determine the total inactivation ratio, using analytical methods described in Env-Ws 380.13, as follows:

a. The temperature of the disinfected water shall be measured at each residual disinfectant concentration sampling point during peak hourly flow;

b. If the system uses chlorine, the pH of the disinfected water shall be measured at least once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow;

c. The disinfectant contact time(s) (T) shall be determined during peak hourly flow; and

d. The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfection shall be measured during peak hourly flow.

(f) A system owner may submit a written request to the department to use existing operational data in lieu of the monitoring conducted under the provisions of (e) above.

(g) The written request shall include the following:

(1) The water system name;

(2) The water system EPA number;

(3) The most recent data for the past year; and

(4) A profile generated using the operational data specified in (3) above.

(h) The data specified in (e) above shall be representative of giardia lamblia inactivation through the entire treatment plant and not just of certain treatment segments.

(i) The department shall determine whether the operational data is substantially equivalent to data collected under the provisions of (e) above.

(j) Until the department approves the request identified in (g) above, the system owner shall conduct monitoring under the provisions of (e), above.

(k) To develop a disinfection profile, a system owner shall calculate the total inactivation ratio as follows:

(1) If a system uses only one point of disinfectant application, the system owner shall determine the total inactivation ratio for the disinfection segment by:

a. Determining one CTcalc/CT99.9 (inactivation ratio) before or at the first customer during peak hourly flow; or

b. Determining successive sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow;

(2) Under (k)(1) b. above, a system owner shall calculate the Σ CTcalc/CT99.9 (total inactivation ratio) by determining the inactivation ratios for each sequence and then adding the inactivation ratio values together to determine the total inactivation ratio;

(3) If a system uses more than one point of disinfectant application before the first customer, the system owner shall determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow and the inactivation ratio value of each segment and the total inactivation ratio shall be calculated using the method in (1) above; and

(4) The system owner shall determine the total logs of inactivation by multiplying the value calculated in (k)(1) or (3) above by 3.0.

(l) The owner of a system that uses chloramines, chlorine dioxide, or ozone for primary disinfection shall also calculate the logs of inactivation for viruses and develop an additional disinfection profile for viruses using methods approved by the department.

(m) Each log inactivation shall serve as a data point in a system disinfection profile.

(n) The system owner shall collect and retain disinfection profile data in the form of a graph or as a spreadsheet and have the data available when the department conducts a sanitary survey pursuant to Env-Ws 306.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.28)

Env-Ws 380.26 Disinfection Benchmarking.

(a) The system owner shall use the profiling data from Env-Ws 380.24 through Env-Ws 380.25 to calculate a disinfection benchmark prior to changing disinfection practices.

(b) Disinfection benchmarking shall be conducted as follows:

(1) The owner of a system required to develop a disinfection profile under the provisions of this section shall consult with the department prior to making a significant change to the system's disinfection practice;

(2) Significant changes to disinfection practice shall include:

a. Changes to the point of disinfection;

b. Changes to the disinfectant(s) used in the treatment plant;

c. Changes to the disinfection process; or

d. Any other disinfection modification identified by the department; and

(3) The owner of a system shall submit the following information to the department as part of the consultation process identified in (b)(1) above:

a. A description of the proposed change;

b. The disinfection profile for giardia lamblia, and, if necessary, viruses, and the disinfection benchmark as required by (d) below;

c. An analysis of how the proposed change will affect the current levels of disinfection; and

d. Any additional information requested by the department based on a determination that the information is needed to make a fully informed decision.

(c) The department shall respond to the request in writing and shall approve the change to the disinfectant practice if it finds that such change complies with department rules and statutes.

(d) The owner of a system receiving department approval to modify the system's disinfection practice shall calculate the disinfection benchmark using the procedures specified in (1) and (2) below:

(1) For each year of profiling data collected and calculated under (p) above, the system owner shall:

a. Determine the average giardia lamblia inactivation for systems serving at least 10,000 for each calendar month for each year of profiling data by dividing the sum of daily giardia lamblia logs of inactivation by the number of values calculated for that month;

b. Determine the average giardia lamblia inactivation for systems serving fewer than 10,000 for each calendar month of profiling data by dividing the sum of weekly giardia lamblia logs of inactivation for that month by the number of values calculated for that month;

c. Determine the lowest average monthly giardia lamblia inactivation for systems serving at least 10,000 in each year of profiling data; or

d. Determine the lowest average monthly giardia lamblia inactivation for systems serving fewer than 10,000 in one year of profiling data; and

(2) The disinfection benchmark shall be the lowest monthly average value, for systems with one year of profiling data, or the average of lowest monthly average values, for systems with more than one year of profiling data, of the monthly logs of giardia lamblia inactivation in each year of profiling data.

(e) A system owner using chloramines, chlorine dioxide, or ozone for primary disinfection shall:

(1) Calculate the disinfection benchmark for viruses using the method in (d) above; and

(2) Submit the information specified in (b)(3) above, to the department within 10 days of obtaining the information.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300); ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.28)

Env-Ws 380.27 Additional Filtration Requirements for All Systems.

(a) Pursuant to 40 CFR 141.502, beginning January 14, 2005, the owner of a public water system that does not meet all of the criteria for avoiding filtration shall provide:

(1) Treatment consisting of disinfection, as specified in Env-Ws 380.11; and

(2) Filtration treatment as specified Env-Ws 380.12.

(b) A water system using conventional filtration treatment or direct filtration shall achieve the following:

(1) The turbidity level of representative samples of the system's filtered water shall be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, measured in accordance with Env-Ws 380.13 and Env-Ws 380.19; and

(2) The turbidity level of representative samples of a system's filtered water shall not exceed 1 NTU, measured in accordance with Env-Ws 380.13 and Env-Ws 380.19.

(c) The owner of a system using lime softening may acidify representative samples prior to analysis

(d) The owner of a water system using filtration treatment other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration may submit a written request to the department to use a filtration treatment not listed in (b) above or in Env-Ws 380.12.

(e) The written request shall include:

(1) The system name;

(2) The system EPA number;

(3) A description of the proposed alternative filtration equipment, disinfection treatment, or both; and

(4) Pilot plant studies conducted to support the use of the proposed alternative treatment.

(f) The department shall respond to the request in writing and shall approve the request if:

(1) The proposed alternative treatment meets the requirements of Env-Ws 380.11; and

(2) The proposed alternative treatment consistently achieves the following:

a. Not less than 99.9% removal or inactivation of giardia lamblia cysts;

b. Not less than 99.99% removal or inactivation of viruses; and

c. Not less than 99% removal of cryptosporidium oocysts.

(g) After installation of treatment, the system shall meet the turbidity requirements specified in Env-Ws 380.12(c).

(h) After installation of treatment, the water system shall consistently achieve the requirements in (g), above.

(i) In addition to monitoring required by Env-Ws 380.19, a public water system owner providing conventional filtration or direct filtration shall:

(1) Conduct continuous monitoring of turbidity for each individual filter using an approved method specified in Env-Ws 380.13; and

(2) Calibrate turbidimeters using the procedure specified by the manufacturer.

(j) A public water system owner shall record the results of individual filter monitoring every 15 minutes.

(k) A SW/GWUDISW system shall complete monthly reporting for individual filters and maintain records according to Env-Ws 380.28.

(l) If there is a failure in the continuous turbidity monitoring equipment, the system owner shall conduct grab sampling every 4 hours in lieu of continuous monitoring until the turbidimeter is repaired and back on-line.

(m) A system owner shall repair the monitoring equipment within*:*

(1) 5 business days of the failure if it serves at least 10,000; and

(2) 14 business days of the failure if it serves less than 10,000.

(n) If a system serving fewer than 10,000 people only consists of 2 or fewer filters, the system owner may conduct continuous monitoring of combined filter effluent turbidity in lieu of individual filter effluent turbidity monitoring. Continuous monitoring shall meet the same requirements set forth in (i) through (l) above.

Source. #7754, eff 8-21-02; ss by #8352, eff 5-14-05 (formerly Env-Ws 380.29)

Env-Ws 380.28 Additional Reporting and Recordkeeping Requirements for All Systems.

(a) Pursuant to 40 CFR 141.503(g), beginning January 14, 2005, in addition to the reporting and recordkeeping requirements in Env-Ws 380.21, the owner of a public water system providing conventional filtration treatment or direct filtration, shall report monthly to the department the information specified in (c) and (e) below.

(b) In addition to the reporting and recordkeeping requirements in Env-Ws 380.21, the owner of a public water system that provides filtration approved under Env-Ws 380.27 shall report monthly to the department the information specified in (c) below.

(c) A system owner shall report turbidity measurements required by Env-Ws 380.27 to the department within 10 days after the end of each month the system serves water to the public.

(d) The reporting in (c) above, shall be in lieu of the reporting specified in Env-Ws 380.21.

(e) The turbidity measurement report identified in (c) above, shall include:

(1) The total number of filtered water turbidity measurements taken during the month;

(2) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in Env-Ws 380.27 (b); and

(3) The date and value of any turbidity measurements taken during the month which exceed one NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the department under Env-Ws 380.27(g).

(f) A system owner shall maintain the results of individual filter monitoring taken under Env-Ws 380.27 for at least 3 years.

(g) A system owner shall report to the department that it has conducted individual filter turbidity monitoring under Env-Ws 380.27 within 10 days after the end of each month the system serves water to the public.

(h) A system owner shall report to the department individual filter turbidity measurement results taken under Env-Ws 380.27 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions identified in (l)(1) through (l)(10) below.

(i) The owner of a system that uses lime softening may submit to the department a written request to exceed the levels specified in (l)(1) through (l)(9) below.

(j) The written request shall include:

(1) The system name;

(2) The system EPA number; and

(3) Documentation that the turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

(k) The department shall respond to the request in writing and shall approve the request if the system demonstrates that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

(l) The system owner shall report to the department individual filter turbidity as follows:

(1) For any individual filter, or for systems serving fewer than 10,000 people with 2 filters that monitor combined filter effluent in lieu of individual filters, that has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart, the system owner shall report:

a. The filter number;

b. The turbidity measurement;

c. The date(s) and times on which the exceedance occurred; and

d. The cause, if known, for the exceedance;

(2) If the system is not able to identify an obvious reason for the abnormal filter performance:

a. A filter profile for the filter within 7 days of the exceedance; and

b. Report to the department that the filter profile has been produced;

(3) For any individual filter that has a measured turbidity level of greater than 0.5 NTU in 2 consecutive measurements taken 15 minutes apart at the end of the first 4 hours of continuous filter operation after the filter has been backwashed or otherwise taken offline:

a. Filter number;

b. Turbidity measurement; and

c. Date(s) and times on which the exceedance occurred;

(4) A system owner shall produce:

a. A filter profile for the filter within 7 days of the exceedance if the system is not able to identify a reason for the abnormal filter performance; and

b. Report to the department that the filter profile has been produced; or

c. Report the reason for the exceedance.

(5) For any individual filter, or for systems serving fewer than 10,000 people with 2 filters that monitor combined filter effluent in lieu of individual filters, that has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 3 consecutive months, the system owner shall report to the department the:

a. Filter number;

b. Turbidity measurement; and

c. Date(s) and times on which the exceedance occurred;

(6) The system owner identified in (l) (5) above, shall:

a. Conduct an assessment, as in (p) below, of the filter within 14 days of the exceedance if a CPE as specified in (q) below, is not required;

b. Submit the assessment by the tenth of the following month unless the assessment was triggered during the last four days of the month then 14 days would apply.

c. In addition, systems serving fewer than 10,000 with 2 filters that monitor CPE in lieu of individual filters shall conduct an assessment on both filters; and

d. Report to the department that the assessment was conducted;

(7) For any individual filter, or systems serving fewer than 10,000 with 2 filters that monitor combined filter effluent in lieu of individual filters, that has a measured turbidity level of greater than 2.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 2 consecutive months, the system owner shall report to the department the:

a. Filter number;

b. Turbidity measurement; and

c. Date(s) on which the exceedance occurred;

(8) The owner of a system serving at least 10,000 people identified in (7) above shall:

a. Arrange for a CPE by the department, no later than 30 days following the exceedance informing the department the CPE is required and the date that it was triggered; and

b. Have the evaluation completed and submitted to the department no later than 90 days following the exceedance;

(9) The owner of a system serving less than 10,000 people identified in (7) above shall:

a. Arrange for a CPE by the department, no later than 60 days following the exceedance informing the department the CPE is required and the date that it was triggered; and

b. Have the evaluation completed and submitted to the department no later than 120 days following the exceedance;

(10) If a CPE has been completed by the department or a third party approved by the department as stated in (m) through (o) below within the 12 prior months or the system and department are jointly participating in an ongoing CTA project at the system, a new CPE shall not be required.

(m) A system owner in (l)(8) above may submit to the department a written request to use a third party to perform the CPE.

(n) The written request shall include:

(1) The system name;

(2) The system EPA number; and

(3) The name, address, and telephone number of the person performing the CPE.

(o) The department shall respond to the request in writing and shall approve the third party request if the third party meets the criteria set forth in Env-Ws 601.05.

(p) The assessment required under (l)(6) above, shall include the following:

(1) An assessment of filter performance;

(2) A development of a filter profile;

(3) An identification and prioritization of factors limiting filter performance;

(4) An assessment of the applicability of corrections;

(5) A filter assessment report; and

(6) The date that the assessment was triggered and the date that it was completed.

(q) A CPE required in (l)(8) above, shall include the following:

(1) An assessment of plant performance;

(2) An evaluation of major unit processes;

(3) An identification and prioritization of performance limiting factors; and

(4) An assessment of the applicability of CTA.

(r) If at any time the turbidity level exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system owner shall notify the department as soon as possible but no later than 24 hours after the exceedance is known.

(s) If at any time the turbidity level in representative samples of filtered water exceeds 5 NTU for filtration treatments other than conventional filtration treatment and direct filtration the system owner shall inform the department as soon as possible, but no later than 24 hours after the exceedance is known.

(t) If a system is subject to disinfection profiling pursuant to Env-Ws 380.24 and Env-Ws 380.25, the system shall report the following information:

(1) Results of optional monitoring which show TTHM levels < 0.064 mg/L and HAA5 levels < 0.048 mg/L if the system wishes to forgo profiling, or that the system has begun disinfection profiling by:

a. Pursuant to 40 CFR 141.532(a), beginning July 1, 2003 for systems serving 500-9,999; and

b. Pursuant to 40 CFR 141.532 (a), beginning January 1, 2004 for systems serving fewer than 500.

(u) A system owner shall maintain the results of a disinfection profile, including raw data and analysis, indefinitely.

(v) If a system is subject to disinfection benchmarking requirements set forth Env-Ws 380.26, the system shall report the following information to the department prior to the system changing its disinfection practice:

(1) A description of the proposed change in disinfection;

(2) T he system's disinfection profile for giardia lamblia and disinfection benchmark; and

(3) An analysis of how the proposed change will affect the current levels of disinfection.

(w) A system owner shall maintain the results of a disinfection benchmark, including raw data and analysis, indefinitely.

Source. #7754, eff 8-21-02; ss by #8352, eff 5-14-05 (formerly part of Env-Ws 380.30)

Env-Ws 380.29 Recycle Provisions and Recordkeeping Requirements.

(a) Each water system owner that employs conventional filtration or direct filtration treatment and that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes shall meet the requirements in (b) through (f) of this section.

(b) Pursuant to 40 CFR 141. 141.76(b), a system owner shall notify the department in writing by December 8, 2003, if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes.

(c) The notification shall include, at a minimum, the following information:

(1) A plant schematic plan showing the origin of all flows which are recycled including, but not limited to:

a. Spent filter backwash water;

b. Thickener supernatant; and

c. Liquids from dewatering processes;

(2) The hydraulic conveyance used to transport them;

(3) The location where the flows are reintroduced back into the treatment plant;

(4) Typical recycle flow in gallons per minute gpm;

(5) The highest observed plant flow experienced in the previous year in gpm;

(6) Design flow for the treatment plant in gpm; and

(7) The department approved operating capacity for the plant if the department has made such determinations.

(d) Pursuant to 40 CFR141.76 (c), the owner of any system that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes shall return these flows through the processes of a system's existing conventional or direct filtration system or at an alternate location approved by the department by June 8, 2004.

(e) If capital improvements are required to modify the recycle location to meet the requirements in (d) above, all capital improvements for the system shall be completed no later than June 8, 2006.

(f) Pursuant to 40 CFR 141.76 (d), the system owner shall collect and retain on file the following information for review and evaluation by the department beginning June 8, 2004:

(1) A copy of the recycle notification and information submitted to the department under (b) and (c) above;

(2) A list of all recycle flows and the frequency with which they are returned;

(3) The average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes;

(4) The typical filter run length and a written summary of how filter run length is determined;

(5) The type of treatment provided for the recycle flow;

(6) Data on the physical dimensions of the equalization and or both treatment units including;

a. Typical and maximum hydraulic loading rates;

b. Type of treatment chemicals used and average dose and frequency of use; and

c. The frequency at which solids are removed, if applicable.

Source. #7754, eff 8-21-02; ss by #8352, eff 5-14-05

## APPENDIX

| Rule Section(s) | State Statute(s) Implemented | Federal Statute(s)/ Regulation(s) Implemented |
|---|---|---|
| Env-Ws 380.01 | RSA 485:3, I | |
| Env-Ws 380.02 | RSA 485:3, I | 40 CFR 141.2 |
| Env-Ws 380.03 | RSA 485:3, I | 40 CFR 141.170<br>40 CFR 141.70 |
| Env-Ws 380.04 | RSA 485:3, I (c) | 40 CFR 141.130 |
| Env-Ws 380.05-380.08 | RSA 485:3, I (c) | 40 CFR 141.171 |
| Env-Ws 380.09-380.11 | RSA 485:3, VI | 40 CFR 141.173 |
| Env-Ws 380.12 | RSA 485:41, IV | 40 CFR 141.73<br>40 CFR 141.171<br>40 CFR 141.500 |
| Env-Ws 380.13 | RSA 485:41, IV | 40 CFR 141.174 |
| Env-Ws 380.14-380.19 | RSA 485:41, IV | 40 CFR 141.175 |
| Env-Ws 380.20-380.21 | RSA 485:41, IV | 40 CFR 141.172 |
| Env-Ws 380.22 | RSA 485:41, II | |
| Env-Ws 380.23 | RSA 485:3, I(b)(2); 485:3, VIII | 40 CFR 141.170<br>40 CFR 141.171<br>40 CFR 141.500 - 40 CFR 141.503<br>40 CFR 141.510<br>40 CFR 141.511<br>40 CFR 141.520 - 40 CFR 141.522 |
| Env-Ws 380.24 - 380.25 | RSA 485:3, I(b)(2); 485:3, VIII | 40 CFR 141.172<br>40 CFR 141.530 - 40 CFR 141.535<br>40 CFR 141.540 - 40 CFR 141.544 |
| Env-Ws 380.26 | RSA 485:3, I(b)(2); 485:3, VIII | 40 CFR 141.173<br>40 CFR 141.174<br>40 CFR 141.503<br>40 CFR 141.550 - 40 CFR 141.553<br>40 CFR 141.560 - 40 CFR 141.562 |
| Env-Ws 380.27 - 380.28 | RSA 485:3, IV | 40 CFR 141.175<br>40 CFR 141.503<br>40 CFR 141.563<br>40 CFR 141.564<br>40 CFR 141.570<br>40 CFR 141.571 |
| Env-Ws 380.29 | RSA 485:3, V | 40 CFR 141.176 |